SECTION D

BIOLOGY

Opening Address by Richard Owen, C.B., F.R.S., President of the Section

The recent construction of the edifice of the British Museum (Natural History), Cromwell Road,[1] and the transference thereto of three of the Departments, the systematic arrangement of which in their respective galleries approaches closely to completion, have left me little leisure in the present year for other scientific work. The expression, moreover, in divers forms and degrees of the satisfaction and instruction such partial exhibition of the national treasures of natural history has afforded to all classes of visitors since the galleries were open to the public, in April last, encourages me to believe that a few words on this great additional instrument in advancing biological science may not be unacceptable to the Section of the British Association which I have now the honour to address.

It is true that when we last met at Swansea, my accomplished colleague, Dr. Albert Günther, F.R.S., selected a general description of the building as the subject of his address to Section D.

I was unwilling then, in consideration of the time of the Section already given to the matter, to respond to appeals of some of our fellow-members for information as to how, and through whom, the new Museum came to be, and to be where it is; but now, honoured by my present position, I venture to hope that a brief outline of its genetic history, which I have been preparing for publication in a fuller form, may be condoned.

In the actual phase of our Science, its cultivators, especially the younger generation, do not rest upon the determination and description, however minute and exhaustive, of the acquisitions so rapidly accumulating of objects or "new species"; but devote themselves also, and more especially, to the investigation of their developmental phenomena.

It has, therefore, seemed to me that it would not be inappropriate, as being germane to the present phase of research, to submit to the Section a few words on the genesis of this new national edifice, generously provided by the State for the promotion of Biology.

On the demise, in 1856, of Sir Henry Ellis, K.T., then Principal Librarian of the British Museum, the Government, made aware of the growth of the Departments of natural history, more especially of geology and palæontology, since the foundation of the Museum in 1753, when the collections of printed books and manuscripts predominated, determined that, together with a principal librarian, there should be associated a new official having special charge of the collections of natural history, but under similar subordinate relations to the Trustees. To this official was assigned the title of "Superintendent of the Departments of Natural History," and I had the honour to be selected for this office.[2]

Almost my first work was to ascertain the extent of my charges, and I confess that I was unprepared to find that the galleries assigned for the arrangement and public exhibition of the several natural history series in the British Museum were so inadequate to these ends as to necessitate the storage of many unexhibited, and in great proportion rare and valuable specimens. This condition affected principally the collection of fossil remains, but in not much less degree that of the recent natural history.

One of my colleagues, Mr. Charles König, then Keeper of the Department of Mineralogy, and most eminent in that science, applied the gallery assigned thereto principally to the rare and beautiful specimens of his favourite subject. When the newer science of palæontology entered upon its rapid growth, and, on the demise of Mr. König, led to the formation of a distinct Department of Geology, the proportion of the British Museum set apart for natural history could not afford for the exhibition of the fossils and rock specimens more or other space than might be gained from or intercalated among the mineral cabinets in one and the same gallery, viz. that which had been originally assigned to Mr. König.

The store-vaults in the basement of the Museum became accordingly invaded by the rapidly-accumulating unexhibited geological specimens, as those receptacles had been, and continued to be, needed for the storage of such specimens, and especially the osteological ones, of the Department of Zoology.

[1] The official designation assigned by the Trustees to the building and its contents.

[2] The date of my appointment is May 26, 1856.

In 1854 Dr. John Ed. Gray, Keeper of the Zoology, reported on the unfitness of the locality of his stored specimens, and prayed for additional accommodation for them.[1] But, on the report of the architect, to whom such appeal was referred, the Trustees "declined to adopt Dr. Gray's suggestion," and recommended "that steps should be taken to obviate the deterioration of the specimens complained of by Dr. Gray in consequence of the damp condition of the vaults in which they are contained."[2] To renewed appeals by the experienced Keeper, and agreeably with his ideas on the nature and extent of the required additional space for the zoology, the Trustees recommended:—"An additional gallery to the Eastern Zoological Gallery, and the substitution of skylights for the side windows," with a view to an additional gallery at an elevation above the floor of the one in use; they also resolved:—"That accommodation be provided for the officers of the Natural History Departments on the roof of the Print-room."[3]

But the inadequacy for exhibition purposes of additional space which might be gained by the new gallery, or by the accessory wall-gallery attainable by stairs in the one in use,[4] was so impressed on my convictions, that I determined, in 1857, to submit to the Trustees a statement embodying estimates of space required for exhibition of all and several the departments of natural history, with the grounds of such estimates, including considerations based upon the ratio of increase during the ten years preceding my appointment, and the conditions likely to affect the proportional number of future annual additions.

This purpose, which I deemed a duty, I endeavoured to effect in a "Report, with a Plan," submitted on February 10, 1859, which Report, being forwarded by the Trustees to the Treasury, and being deemed worthy of consideration by Parliament, was "Ordered by the House of Commons to be printed, 11th March, 1859," and can still be obtained at the Office of Parliamentary Papers or Blue Books.[5]

The Report included, as I have stated, estimates of space for the then acquired specimens of the several departments of natural history, together with space for the reception of the additional specimens which might accrue in the course of a generation, or thirty years. It further recommended that such museum-building, besides giving the requisite accommodation to the several classes of natural history objects, as they had been by authority exhibited and arranged for public instruction and gratification, should also include a hall, or exhibition-space for a distinct department, adapted to convey an elementary knowledge of the subjects of all the divisions of natural history to the large proportion of public visitors not specially conversant with any of those subjects.

I may crave permission to quote from that part of my Report which has received the sanction of the "Commission on the Advancement of Science" of 1874: "One of the most popular and instructive features in a public collection of natural history would be an apartment devoted to the specimens selected to show type-characters of the principal groups of organised and crystallised forms. This would constitute an epitome of natural history, and should convey to the eye in the easiest way an elementary knowledge of the sciences."[6]

An estimate of the space required for such apartment is given, and it has been obtained in the new Museum of Natural History.

I ventured also on another topic in connection with the more immediate object of my Report. Previous experience at the museum of the Royal College of Surgeons had impressed me with the influence on improved applications of collections and on the ratio of their growth, through Lectures expository of their nature. I felt confident that, with concurrence of authorities, both relations would be exemplified under the actual superintendence at the British Museum. Moreover, such museum of natural history has wider influences over possessors and collectors of rarities and of desiderated specimens than one of restricted kind, as in Lincoln's Inn Fields. I concluded my Report, therefore, by referring to the lecture theatre shown in

[1] See Parliamentary Paper, or Blue Book, folio 1858, entitled:—"Copies of all Communications made by the Officers and Architect of the British Museum to the Trustees, respecting the want of space for exhibiting the Collections in that Institution," p. 4. [2] *Ib.* p. 5. [3] *Ib.* p. 25 and p. 28.

[4] In his report of December 29, 1856, Dr. Gray states:—"Scarcely half of the zoological collections is exhibited to the public, and their due display would require more than twice the space devoted to them."—*Ib.* p. 21. To any removal of the natural history to another site Dr. Gray was strongly opposed.

[5] Parliamentary Papers, "Report with Plan," &c. (126, i.), fol. 1859.

[6] Report, *ut supra*, p. 22.

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my plan, and expressed my belief that "Administrators will consider it due to the public that the gentlemen in charge of the several departments of the National Collection of Natural History should have assigned to them the duty of explaining the principles and economical relations of such departments, in elementary and free lectures, as, *e.g.* on Ethnology, Mammalogy, Ornithology, Herpetology and Ichthyology, Malacology and Conchology, Entomology, Zoophytology, Botany, Geology, Palæontology, Mineralogy."

After the lapse of twenty years I have lived to see the fulfilment of all the recommendations, save the final one, of my Report of 1859. The lecture-theatre was erased from my plan, and the elementary courses of lectures remain for future fulfilment.

Considering that, in the probable communication of this Report to Parliament, I was addressing the representatives of the greatest commercial and colonising nation in the globe, representatives of an empire exercising the widest range of navigation and supreme in naval power, such nation and empire might well be expected by the rest of the civilised world to offer to students and lovers of natural history the best and noblest museum of the illustrations of that great division of general science.

But for such a museum, a site or superficial space of not less than eight acres was asked for, the proportion of such space to be occupied by the proposed building being, at first, limited, and dependent upon its architectural arrangement in one, two, or more storeys. But the effect of restricting the site or available superficial space to that, *e.g.* on which the Museum at Bloomsbury now stands, was significantly demonstrative of difficulties to come, and concomitantly indicative of the administrative wisdom which would be manifested by securing, in a rapidly growing metropolis, adequate space for future additions to the building which might be in the first place erected thereupon.

Nevertheless one or two of my intimate and confidential friends dissuaded me from sending in a Report which might be construed or misinterpreted as exemplifying a character prone to inconsiderate and extravagant views, and such as might even lead to disagreeable personal consequences. Moreover the extent of space reported for seemed inevitably to involve change of locality. Two of my colleagues occupied the elegant and commodious residences attached to the British Museum; and it was possible that provision for such residences marked in the plan which accompanied my Report might not be adopted. Moreover no statement of grounds for adequate space requirements for the whole of the National Museum of Natural History had previously been submitted to authority. The legislative mind had not been prepared for calm and due consideration of the subject. Still I flattered myself that, by whomsoever the details and aims and grounds of my Report were known and comprehended, any strong opposition on the part of Parliament could hardly be expected. Nevertheless, an Irish Member seeing a way to a position in the House which is gained by the grant of a Committee of Inquiry, of which the Mover becomes Chairman, made my Report and Plan the ground of a motion to that effect, which was carried. The Select Committee, after taking the evidence published in the Blue Book (ordered to be printed August 10, 1860, quarto, pp. 238, with ten plans), reported against the removal of the Natural History Collections from the British Museum. As to the chief reasons alleged for such removal the Report states that with one "eminent exception the whole of the scientific naturalists examined before your Committee, including the Keepers of all the Departments of Natural History in the British Museum, are of opinion that an exhibition on so large a scale tends alike to the needless bewilderment and fatigue of the public, and the impediment of the studies of the scientific visitor . . . . Your Committee, therefore, recommend the adoption of the more limited kind of exhibition advocated by the other witnesses, in preference to the more extended method recommended by Prof. Owen."

Lest however the House might attach undue weight to the exceptional testimony, the chairman of the Committee deemed it his duty, in bringing up the Report, to warn the House of the character of such testimony, and his speech left, as I was told, a very unfavourable impression as regards myself. I was chiefly concerned to know what might be put upon record in "Hansard." In that valuable work hon. members revise their reported utterances before the sheets go to press. I was somewhat relieved to find Mr. Gregory regretting that "a man whose name stood so high should connect himself with so foolish, crazy, and extravagant a scheme, and should persevere in it after the folly had been pointed out by most unexceptionable witnesses. . . . "They had on one side, and standing alone, Prof. Owen and his ten-acre scheme, and on the other side all the other scientific gentlemen, who were perfectly unanimous in condemning the plan of Prof. Owen as being utterly useless and bewildering. . . . "Among these gentlemen were Prof. Huxley, Prof. Maskelyne, Mr. Waterhouse, Dr. Gray, Sir Roderick Murchison, Mr. Thomas Bell, P.G.S., Dr. Sclater, Sec.Z.S., Mr. Gould, and SirBenjamin Brodie. To give the House some idea of that gigantic plan, he might mention that a part of it consisted of galleries 850 feet in length for the exhibition of whales. The scientific men examined on the subject, one and all, disapproved of that plan *in toto;* and they advocated what was technically called a 'typical mode of exhibition.'"[1]

In point of fact that Supplementary Exhibition Room which was planned and recommended for the purpose I have already cited, was urged by the instructor of Mr. Gregory as the sole reasonably required National Museum of Natural History, for which the nation ought to be called upon to provide space and funds, a conclusion subsequently adopted and unanimously recommended by the Royal Commission on Science.[2]

Although grief was natural and considerable at this result, not without mortification at the reception by Parliament of the "Report and Plan" submitted thereto, I now feel grateful that the sole responsibility of their author is attested in the pages of a Work[3] which will last as long as, and may possibly outlast, the great legislative organisation whose debates and determinations are therein authoritatively recorded.

I was not, however, cast down, nor did I lose either heart or hope; I was confident in the validity of the grounds of my appeal, and foresaw in the inevitable accumulations year by year, the evidence which would attest its soundness and make plain the emergency of the proposed remedy.

Moreover, there was one who, though not a naturalist, had devoted more time, pains, and thought to the subject than had been bestowed by any—whether naturalist or administrator—who testified adversely thereon. The Right Hon. William Ewart Gladstone, an elected Trustee of the British Museum, took nothing on trust; he explored with me in 1861 every vault and dark recess in the Museum which had been or could be allotted to the non-exhibited specimens of the natural history, those, viz. which it was my aim to utilise and bring to light. He gave the same attention to the series selected for exhibition in the public galleries, and appreciated the inadequacy of the arrangements to that end. He listened to my statements of facts, to the grounds of prevision of annual ratios of increase, to the reasons for providing space therefor, to my views of the aims of such exhibitions, and to the proposed extended applications and elucidations of the collections. Mr. Gladstone tested every averment, and elicited the grounds of every suggestion, with a tact and insight that contrasted strongly with the questionings in Mr. Gregory's committee-room, where too often vague interrogations met with answers to match.

Conformably with Mr. Gladstone's convictions, he as Chancellor of the Exchequer moved, May 12, 1862, for "Leave to bring in a Bill for removal of portions of the Trustees' Collections in the British Museum."

On May 19, when the Bill was to be read a second time, a new, unexpected, and formidable antagonist arose. Mr. Disraeli early got the attention of the House to a speech, warning hon. members of the "progressive increase of expenditure on civil estimates," and laying stress on the fact that the "estimates of the actual year showed no surplus."[4] The influence of this advocacy of economy is exemplified in the debate which ensued. For repetitions of the nature and terms of objections to the Report and plan, as already denounced by Mr. Gregory, Mr. Bernal Osborne, and others, reference may be made to the volume of "Hansard" cited below. An estimable hon. member, whose words had always and deservedly carried weight with the country party, lent his influence to the same result. Mr. Henley, representative of Oxfordshire, said:—"All the House knew was that a building was to be put up somewhere. He considered this a bad way of doing business, particularly at a time when nobody could be sanguine that the finances of the country were in a flourishing state. Let the stone once be set rolling, and then all gentlemen of science and taste would have a kick at it, and it would be knocked from one

1 "Hansard." Debate of July 22, 1861, pp. 1861, 1918.
2 Fourth Report, p. 4. 3 "Hansard," *ut supra.* 4 *Ib.* 1862, p. 1927.

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to the other, and none of them probably would ever live to see an end of the expense."[1]

Permit me to give one more example of the baneful influence of the opening speech on our great instrument of scientific progress. Mr. Henry Seymour, Member for Poole, said:—"If a foreigner had been listening to the debates of that evening it must have struck him that it was, to say the least, a rather curious coincidence that a proposal to vote 600,000*l.* for a new collection of birds, beasts, and fishes at South Kensington should have been brought forward on the very evening when the Leader of the Opposition had made a speech denouncing that exorbitant expenditure—a speech, he might add, which was re-echoed by many Liberal members of the House."[2]

It was however not a "curious," but a "designed coincidence." Mr. Disraeli, knowing the temper of the House on the subject, and that the estimates for the required Museum of Natural History were to be submitted by Mr. Gladstone, chose the opportunity to initiate the business by an advocacy of economy which left its intended effect upon the House. In vain Lord Palmerston, in reply to the Irish denunciators, proposed as a compromise to "exclude whales altogether from disporting themselves in Kensington Gardens."[3] The Government was defeated by a majority of ninety-two, and the erection of a National or British Museum of Natural History was postponed, to all appearance indefinitely, and in reality for ten years.

Nevertheless, neither averments nor arguments in the House on May 19, 1862, nor testimonies in the hostile Committee of 1860, 1861, had shaken my faith in the grounds on which the "Report and Plan of 1859" had been based. The facts bearing thereupon, which it was my duty to submit in my "Annual Reports on the Natural History Departments of the British Museum," would, I still hoped, have some influence with hon. members of the legislature, to whom those Reports are transmitted.

The annual additions of specimens continued to increase in number and in value year by year. I embraced every opportunity to excite the interest of lovers of natural history travelling abroad and of intelligent settlers in our several colonies to this end, among the results of which I may cite the reception of the Aye-Aye, the Gorilla, the Dodo, the Notornis, the maximised and elephant-footed species of Dinornis, the representatives of the various orders and genera of extinct Reptilia from the Cape of Good Hope, and the equally rich and numerous evidences of the extinct Marsupialia from Australia, besides such smaller rarities as the animals of the Nautilus and Spirula.

Wherever room could be found in the exhibition galleries at Bloomsbury for these specimens, stuffed or as articulated skeletons, or as detached fossils, they were squeezed in, so to speak, to mutely manifest to all visitors, more especially administrative ones, the state of cram to which we were driven at Bloomsbury.

Another element of my Annual Reports was the deteriorating influence on valuable specimens of the storage vaults and the danger of such accumulations to the entire Museum and its priceless contents. And here perhaps you may deem some explanation needful of the grounds of the latter consideration addressed to economical granters of the national funds.

The number of specimens preserved in spirits of wine amounted to thousands; any accidental breakage, with conflagration, in the subterraneous localities contiguous with the heating-apparatus of the entire British Museum, would have been as destructive to the building as the gunpowder was meant to be when stored in the vaults beneath King James's Houses of Parliament.

At this crisis the "Leading Journal," after the stormy debate of May 19, 1862, made the following appeal to me:—"Let Mr. Owen describe exactly the kind of building that will answer his purpose, that will give space for his whales and light for his humming-birds and butterflies. The House of Commons will hardly, for very shame, give a well-digested scheme so rude a reception as it did on Monday night."[4]

My answer to this appeal was little more than some amplification, with additional examples, of the several topics embodied in the original Report. The pamphlet "On the Extent and Aims of a National Museum of Natural History," with reduced copies of the plans, went through two editions, and no doubt had the effect anticipated by the able Editor.

Another element of reviving hope was the acceptance by Mr. Gregory of the government of a tropical island.

The sagacious Prime Minister accurately gauged the modified feeling—the subsiding animosity—of Parliament on the subject, and submitted (June 15, 1863) a motion "for leave to purchase five acres for the required Natural History building." The choice of locality he left to honourable members. Lord Palmerston pointed out that the requisite extent of site could be obtained at Bloomsbury for 50,000*l.* per acre, and that it could be got at South Kensington for 10,000*l.* per acre; and his lordship distinctly stated that the space, in either locality, would be bought for the purpose of a Museum of Natural History. The purchase of the land at South Kensington was accordingly voted by 267 against 135, and thus the Government proposition was carried by a majority of 132. By this vote the decision of Mr. Gregory's Committee was virtually annulled.

In a conversation with which I was favoured by Lord Palmerston, I interposed a warning against restriction of space, and eventually eight acres of ground were obtained, including the site of the Exhibition Building of 1862, opposite Cromwell Gardens, and that extent of space is now secured for actual and prospective requirements of our National Museum of Natural History.

I am loth to trespass further on the time of the Section, but a few words may be expected from me of the leading steps to the acquisition of the present edifice, occupying a portion—about one-third—of that extent of ground.

Mr. Gladstone, adhering to the convictions which led him to submit his financial proposition of May, 1862, honoured me, at the close of that session of Parliament, with an invitation to Hawarden to discuss my plans for the Museum Building; and, after consideration of every detail, he requested that they might be left with him. He placed them, with my written expositions of details, in the hands of Sir Henry A. Hunt, C.B., responsible adviser on buildings, &c., at the Office of Works, with instructions that they should be put into working form, so as to support reliable estimates of cost. I was favoured with interviews with Sir Henry, resulting in the completion of such working plans of a museum, including a central hall, an architectural front of two storeys, and the series of single-storeyed galleries extending at right angles to the front, as shown in my original Plan. I was assured that such plan of building affording the space I had reported on, would be the basis to be submitted to the professional Architect whenever the time might arrive for Parliamentary sanction to the cost of such building.

Here I may remark that experiments which preceded the substitution, in 1835, of the actual Museum of the Hunterian Physiology at the Royal College of Surgeons, for the costly, cumbrous, and ill-lit building, with its three-domed skylights, which preceded it, had led to the conclusion that the light best fitted for a museum was that in which most would be reflected from the objects and least directly strike upon the eye; and this was found to be effected by admittance of the light at the angle between the wall and roof. But this plan of illumination is possible only in galleries of one storey, or the topmost in a many-storeyed edifice. Such system of illumination may be seen in every gallery of the museum described to you last year at Swansea, save those of the storeys of the main body below the sky-lit one which necessitate side windows.

I subjoin a copy of the letter from Sir Henry A. Hunt, conveying his conclusions respecting the plan of building discussed with him:—

"4, *Parliament Street, September* 25, 1862

"My Dear Sir,—I return you the drawings of the proposed Museum of Natural History at South Kensington. In May last I told Mr. Gladstone that the probable cost of covering five acres with suitable buildings would be about 500,000*l.*, or 100,000*l.* per acre.

"The plan proposed by you will occupy about four acres, and will cost about 350,000*l*, or nearly 90,000*l.* per acre.

"Having prepared sketches showing the scheme suggested by you, I have been able to arrive more nearly at the probable cost than I had the means of doing in May last. But, after all, the difference is not great; although the present estimate is a more reliable one than the other. It is right, however, to state that the disposition of the building as proposed by you will give a greater amount of accommodation, and admit of a cheaper mode of construction, than I had calculated upon in May (relatively with the space intended to be covered), and therefore I think your plan far better adapted for the Museum than the plan I took the liberty to suggest to Mr. Gladstone.

"Believe me, &c,

"(Signed) Henry A. Hunt"

[1] "Hansard," p. 1932. [2] *Ib.* 1862, p. 1918. [3] *Ib.* p. 1931.
[4] The *Times*, May 21, in a leader on the Museum Debate.

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Sir H. A. Hunt had previously formed an estimate of cost for the Chancellor of the Exchequer on inspection of the Report and plan in the Parliamentary paper of March, 1859. The letter to which I refer I regard as an antidote to some previous quotations from adverse members of Parliament.

The working plans of Sir Henry A. Hunt were subsequently submitted for competition, and the designs of the accomplished and lamented Capt. Fowke, R.E., obtained the award in 1864. His untimely death arrested further progress or practical application of the prize designs.

In 1867 Lord Elcho pressed upon the House of Commons, through the Hungerford Bridge Committee, the Thames Embankment as a site for the New Museum of Natural History, but unsuccessfully. The debates thereon, nevertheless, caused some further delay.

In 1871 a vote of 40,000*l.* for beginning the Museum Buildings at South Kensington was carried without discussion. In 1872 a vote of 29,000*l.* for the same building was opposed by Lord Elcho, but was carried by a majority of 40 (85 against 45).

On the demise of Capt. Fowke Mr. Alfred Waterhouse was selected as architect. He accepted the general plans which had been sanctioned and approved by Sir H. A. Hunt and by Capt. Fowke, and I took the liberty to suggest, as I had previously done to Capt. Fowke, that many objects of natural history might afford subjects for architectural ornament; and at Mr. Waterhouse's request I transmitted numerous figures of such as seemed suitable for that purpose. I shall presently refer to the beautiful and appropriate style of architecture which Mr. Waterhouse selected for this building, but am tempted to premise a brief sketch of what I may call the "Genealogy of the British Museum," or what some of my fellow-labourers, agreeably with the actual phase of our science, may prefer to call its "Phylogeny."

Sir Hans Sloane, M.D., after a lucrative practice of his profession in the then flourishing colony of Jamaica, finally settled at Chelsea, and there accumulated a notable museum of natural history, antiquities, medals, cameos, &c., besides a library of 50,000 volumes, including about 350 portfolios of drawings, 3500 manuscripts, and a multitude of prints. These specimens were specified in a MS. catalogue of thirty-eight volumes in folio, and eight volumes in quarto. Sir Hans valued this collection at the sum of 80,000*l.*; but at his death, in 1753, it was found that he had directed in his "Will" that the whole should be offered to Parliament for the use of the public on payment of a minor sum, in compensation to his heirs. This offer being submitted to the House of Commons, it was agreed to pay 20,000*l.* for the whole. At the same time the purchase of the Cottonian Library and of the Harleian MSS. was included in the Bill.[1]

The following are the terms of the enactment :—

Act 26, George II., Cap. 22 (1753).—*Sections IX. ana X.*

"(IX.) And it be enacted by the authority aforesaid, that within the cities of London or Westminster or the suburbs thereof, one general repository shall be erected or provided in such convenient place and in such manner as the trustees hereby appointed, or the major part of them, at a general meeting assembled, shall direct for the reception not only of the said museum or collection of Sir Hans Sloane, but also of the Cottonian Library and of the additions which have been or shall be made thereunto by virtue of the last will and testament of the said Arthur Edwards, and likewise of the said Harleian collection of manuscripts and of such other additions to the Cottonian Library as, with the approbation of the trustees by this Act appointed, or the major part of them, at a general meeting assembled, shall be made thereunto in manner hereinafter mentioned, and of such other collections and libraries as, with the like approbation, shall be admitted into the said general repository, which several collections, additions, and library so received into the said general repository shall remain and be preserved therein for public use to all posterity.

"(X.) Provided always that the said museum or collection of Sir Hans Sloane, in all its branches, shall be kept and preserved together in the said general repository whole and entire, and with proper marks of distinction."

[1] In his letter of February 14, 1753, to his friend Mann, Horace Walpole, then Member for Lynn, writes:—"You will scarce guess how I employ my time, chiefly at present in the guardianship of embryos and cockle-shells. Sir Hans Sloane is dead, and has made me one of the trustees of his museum, which is to be offered for twenty-thousand pounds to the King and Parliament and (in default of acceptance) to the Royal Academies of Petersburg, Berlin, Paris, and Madrid. He valued it at four-score thousand, and so would any one who loves hippopotamuses, sharks with one ear, and spiders as big as geese. The king has excused himself, saying he did not think that there were twenty thousand pounds in the Treasury."—"Letter to Horace Mann," 8vo, vol. iv. p. 32.

The trustees appointed under the Act are of four classes: Royal, Official, Family, and Elected. The first class includes one trustee appointed by the Sovereign; the second class includes the Lord Archbishop of Canterbury, the Lord High Chancellor, the Speaker of the House of Commons, and twenty-two other high officials and presidents of societies. The three first in this class are designated "Principal Trustees," and in them is vested the patronage or appointment to every salaried office save one in the British Museum; the exception being the Principal Librarian, who is appointed by the Sovereign. Of the Family Trustees, the Sloane collections are now represented by the Earl of Derby and the Earl of Cadogan, the Cottonian Library by the Rev. Francis Annesley and the Rev. Francis Hanbury Annesley, the Harleian manuscripts by Lord Henry, C. G. Gordon-Lennox, M.P., and by the Right Hon. George A. F. Cavendish Bentinck, M.P. Among the Elected Trustees the honoured name of Walpole, associated with the origin of the British Museum, is continued by the Right Hon. Spencer Horatio Walpole, M.P., to whom the requisite Parliamentary business of the Museum is usually confided.

I may call attention to "the suburbs of London or Westminster" as one of the localities specified in the original Act of Parliament, and such situation was selected for the locality of the Library and the Museum. The Government issued lottery-tickets to the amount of 300,000*l.*, out of the profits of which the 20,000*l.* for the Sloanian Museum was paid and purchase made of a suitable building, with contiguous grounds for its reception and the lodgment of keepers.

To the north of the metropolis, about midway between the two cities of London and Westminster, there stood, in 1753, an ancient family mansion called Montague House. This is defined by Smollet in his "History of England" as "one of the most magnificent edifices in England."[1] Its style of architecture was that of the Tuilleries in Paris. From London it was shut off by a lofty brick wall, in the middle of which was a large ornamental gateway and lodge, through which, in my earlier years as a student of natural history, I have often passed to inspect, through the kindness of the then keepers of mineralogy and zoology, and make notes on, the Sloanian and subsequently-added rarities.

To the north of Montague House were the extensive gardens, beyond which stretched away a sylvan scene to the slopes of Highgate and Hampstead Hills.

The original location of the British Museum was more apart and remote from the actual metropolis and less easy of access than is the present Museum of Natural History at the West End.

The additions to the natural history series, which accrued from 1753 to 1833, together with the growth of other departments, necessitated provision of corresponding conservative and exhibition spaces. These were acquired by the erection, on the site of Montague House, of the present British Museum, the architect, Sir Sidney Smirke, adopting the Ionic Greek style.

The extent of space afforded by this edifice in comparison with that of its predecessor was such as to engender a conviction that it would suffice for all subsequent additions. The difficulty in our finite nature and limited capacity of looking forward is exemplined in such names as New College at Oxford, Newcastle, New Street, New Bridge, &c., as if nothing was ever to grow old; and the same restricted power of outlook affects our prevision of requirements of space for ever-growing collections.

The Printed Book Department, which took the lion's share of the then new British Museum, found itself compelled in the course of one generation to appropriate the quadrangle left by Smirke in order to admit light to the windows of the galleries, looking that way or inwards.

From analogy I foresee that some successor of mine may exemplify human short-sightedness in my limit of demand to eight acres for the growth of the present Museum.

However, these acres, after conflicts stretching over a score or more of years, have at last been acquired for due display and facilities of study of the subjects of Section D.

Amongst the works of architectural art which adorn the metropolis, Westminster Abbey and St. Paul's Cathedral stand supreme. Of later additions may with them be named the noble example of the Perpendicular Gothic selected by Barry for the Houses of Parliament, and, I may be permitted to add, the new Law Courts, which exemplify the more severe style of the Thirteenth-century Gothic.

[1] Ed. 1825, p. 332.

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Mr. Alfred Waterhouse, R.A., for the realisation of the plans and requirements of our Museum of Natural History, has chosen an adaptation of the Round-arched Gothic, Romanesque, or Romaic of the twelfth century. No style could better lend itself to the introduction, for legitimate ornamentation, of the endless beautiful varieties of form and surface sculpture exemplified in the animal and vegetable kingdoms. But the skill in which these varieties have been selected and combined to produce unity of rich effects will ever proclaim Mr. Waterhouse's supreme mastery of his art.

I need only ask the visitor to pause at the grand entrance, before he passes into the impressive and rather gloomy vestibule which leads to the great hall, and prepares him for the flood of light displaying the richly-ornamented columns, arcades, and galleries of the Index Museum.

In the construction of a building for the reception and preservation of perishable objects, the material should be of a nature that will least lend itself to the absorption and retention of moisture. This material is that artificial stone called terra-cotta. The compactness of texture which fulfils the purpose in relation to dryness is also especially favourable for a public edifice in a metropolitan locality. The microscopic receptacles of soot-particles on the polished surface of the terra-cotta slabs are reduced to a minimum; the influence of every shower in displacing those particles is maximised. I am sanguine in the expectation that the test of exposure to the London atmosphere during a period equal to that which has elapsed since the completion of Barry's richly ornamented palace at Westminster, now so sadly blackened by soot, will speak loudly in favour of Mr. Waterhouse's adoption of the material for the construction of the National Museum of Natural History. A collateral advantage is the facility to which the moulded blocks of terra-cotta lend themselves to the kind of ornamentation to which I have already referred.

In concluding the above sketch of the development of our actual Museum of Natural History, I may finally refer, in the terms of our modern phylogenists, to the traceable evidences of "ancestral structures." In the architectural details of the new Natural History Museum you will find but one character of the primitive and now extinct museum retained, viz. the Central Hall. In Montague House there were no galleries, but side-lit saloons or rooms of varying dimensions and on different storeys.

In its successor, the Museum developed on its site at a later period, we find galleries added: that, for example, which was appropriated to the birds and shells being 300 feet in length. This architectural organisation still exists at Bloomsbury.

The Museum, which may be said to have budded off, has risen to a still higher grade of structure after settling down at South Kensington. In its anatomy we find, it is true, the central hall and long side-lit galleries; but in addition to these inherited structures we discern a series of one-storeyed galleries, manifesting a developmental advance in the better admission of light and a consequent adaptation of the walls as well as the floor to the needs of exhibition.[1]

Should the Section, as did the Académie des Sciences in relation to the passage cited, kindly condone such application to human contrivances of the current genealogical or phylogenetic language applied to vital structures, your President need hardly own his appreciation of the vast superiority of every step in advance which is manifested in existing as compared with extinct organisms. And thus, sensible as far as human faculty may comprehend them, that organic adaptations transcend the best of those conceived by the ingenuity of man to fulfil his special needs, he would ask whether analogy does not legitimately lead to the inference, for organic phenomena, of an Adapting Cause operating in a corresponding transcendent degree?

In conclusion, I am moved to remark that a Museum giving space and light for adequate display of the national treasures of Natural History may be expected to exert such influence on the progress of Biology as to condone, if not call for, a narrative of the circumstances attending its formation in the Records of the British Association for the Advancement of Science.

[1] In the notable reply (*Annales des Sciences Naturelles*, 1829) to an illustration of the unity of composition or of plan in Cephalopods and Vertebrates, by bending one of the latter so as to bring the pelvis in contact with the nape, advocated by Geoffroy St. Hilaire, Cuvier did not deem it too trivial to call in architecture to elucidate his objections. "La *composition d'une maison*, c'est le nombre d'appartemens ou de chambres qui s'y trouve; et son *plan*, c'est la disposition réciproque de ces appartemens et de ces chambres. Si deux maisons contenaient chacune un vestibule, une antichambre, une chambre à coucher, un salon, et une salle à manger, on dirait que leur *composition est la même*; et si cette chambre, ce salon, &c., étaient au même étage arrangés dans le même manière, on dirait aussi que leur *plan est le même*. Mais si leur ordre était différent, si de plain-pied dans une des maisons, ces pièces étaient placées dans l'autre aux étages successifs, on dirait qu'avec une composition semblable ces maisons sont construites sur des plans différens" (p. 245).

OUR ASTRONOMICAL COLUMN

ENCKE'S COMET.—We continue the ephemeris of this comet in the contracted form adopted in NATURE, vol. xxiv. p. 292, from the calculations of Dr. O. Backlund of Pulkowa:—

At Berlin midnight

	R.A. h. m. s.	Decl. ° ′	Log. distance from Sun.	Log. distance from Earth.
Sept. 2	4 23 4	+35 53·2	0·1659	0·0222
4	4 31 17	36 35·9		
6	4 40 7	37 19·2	0·1493	9·9885
8	4 49 38	38 3·0		
10	4 59 56	38 46·8	0·1317	9·9535
12	5 11 6	39 30·3		
14	5 23 16	40 12·8	0·1128	9·9173
16	5 36 32	40 53·3		
18	5 51 1	41 30·9	0·0926	9·8805
20	6 6 51	42 4·1		
22	6 24 7	42 30·9	0·0709	9·8439
24	6 42 54	42 49·3		
26	7 3 13	42 56·3	0·0474	9·8089
28	7 25 0	42 49·3		
30	7 48 5	42 24·9	0·0219	9·7776
Oct. 2	8 12 13	+41 40·4		

In 1848, when the perihelion passage occurred eleven days later than it will do in the present year, the comet was remarked to be "just visible" to the naked eye at Harvard Observatory, U.S., on the morning of October 9, when the theoretical intensity of light was 4·3, and it was "plainly visible" to the naked eye on the morning of November 4, with an intensity of 9·5. The latter is a greater value than will be attained at this appearance, the maximum being 7·5 on November 9. On October 10 the calculated brightness will be equal to that, when it was just visible without the telescope in 1848, but moonlight will interfere at the time. For about four weeks after September 10 the comet will not set in London. As we have already stated it will be nearest to the earth on October 11, and in perihelion on November 15.

[Since the above was in type we learn from Mr. A. A. Common that he detected Encke's comet with his three-feet reflector at Ealing, shortly before midnight on Saturday last. On the following night, when it was better seen, its diameter was about 2′, and there was a central condensation of light.]

SCHAEBERLE'S COMET.—This comet will soon be well observable in the other hemisphere. The following track depends upon elements which Dr. v. Hepperger has calculated from observations to August 11:—

At Berlin Midnight.

	R.A. h. m.	Decl. ° ′	Log. distance from Earth.	Intensity of light.
Sept. 1	13 30·0	+11 27	9·8329	12·5
5	13 52·7	+ 1 41	9·8965	8·5
9	14 7·7	− 5 32	9·9606	5·7
13	14 18·1	10 52	0·0198	3·8
17	14 25·7	14 56	0·0725	2·6
21	14 31·4	18 8	0·1191	1·9
25	14 36·1	20 42	0·1601	1·4
29	14 40·0	22 51	0·1962	1·0
Oct. 3	14 43·5	24 41	0·2284	0·8
7	14 46·6	−26 16	0·2569	0·6

The intensity of light on July 18, the date of the first European observation, is taken as unity.

NOTES

THE Royal Gardens, Kew, have just received, through the kind exertions on their behalf of Sir Ferdinand von Mueller, K.C.M.G., F.R.S., Government Botanist, Melbourne, perhaps the most remarkable Australian Cycadaceous stem which has ever been imported into this country. It is about four feet high, five and a half feet in circumference, and weighs about six hundredweight. It is the type of a new species described by von

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